

**ADDITIONAL FEES:**

A check in the amount of \$84.00 is enclosed to cover the cost of one additional independent claim in excess of three. Should the check prove insufficient for any reason or should it be determined that an additional fee is due, authorization is hereby given to charge any such deficiency or additional fee to our Deposit Account No. 01-0268.

**REMARKS**

In the last Office Action, claims 1-5 were rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,914,763 to Fujii et al. ("Fujii"). The Examiner stated that Fujii discloses a display device in Figs. 1, 4-7 and 11-13 comprising an insulating glass substrate 311 on which display electrodes and wiring electrodes are formed (citing col. 14, lines 61-65), an opposing substrate 312 opposed to the insulating substrate, and a display material 350 contained in a spacing between the insulating substrate and the opposing substrate in a sealed manner 36 (citing col. 13, lines 7-17), wherein the wiring electrodes 41 (citing Figs. 4-7) are metallized by ITO plating/film, and portions of each of the wiring electrodes extend across a contour line of the opposing substrate as shown in Figs. 12A-B (claim 1). The Examiner further stated that Fujii discloses a dummy electrode 45 (Fig.

4 and col. 10, lines 47-60) provided outside the outermost one of the wiring electrode and outside the opposite-end wiring electrodes in each of the wiring electrode groups shown in Figs. 7B and 7C (claim 4) and parallel to the outermost wiring electrode (claim 5), the dummy electrode 46 (Fig. 5) being placed between the wiring electrode 41, and having the claimed spacing between the dummy electrodes 45/46 and the wiring electrodes 41.

Claim 6 was rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,636,329 to Sukegawa et al. ("Sukegawa"). The Examiner stated that Sukegawa (citing cols. 1 and 28) discloses a liquid crystal display device in which a group of pads 9 are arranged on insulating substrate so that as to corresponding to connection terminals of a semiconductor chip 31, a group of check pads 8 provided between the display electrodes in display portion for breakdown checking, wiring electrodes 2 for establishing electrical connections between display electrodes and the group of check pads 8 corresponding to the semiconductor terminals and electrical connections between the group of pads 9 corresponding the semiconductor chip terminals, the group of check pads being arranged in a straight row or column at the periphery of the insulating substrate.

Applicants and applicants' counsel acknowledge with appreciation the indication of allowable subject matter in claim 7. Claim 6 has been amended to incorporate the subject matter of claim 7 and is believed to be in allowable form. However, applicants also believe that claims 1-5 patentably distinguish over the prior art.

By the present response, claims 1-6 have been amended in formal respects to improve the wording. Marked-up copies of the amended claims are submitted concurrently herewith in an attachment to this amendment entitled **"Version With Markings to Show Changes Made."**

To obtain a fuller scope of coverage, new claims 8-20 have been added. Adequate support for the subject matter recited in these claims may be found in the specification as originally filed.

Applicants respectfully submit that amended claims 1-6 and newly added claims 8-20 patentably distinguish over the prior art of record.

The present invention relates to a display device having transparent electrodes with metallized wiring portions. Figs. 2A and 2B of the application drawings illustrate a conventional chip-on-glass display device. Transparent ITO electrodes are formed on a glass substrate 1. Different portions of the transparent electrodes serve as display

electrodes 4 and wiring electrodes 6. The glass substrate 1 and an opposing substrate 2 opposed thereto are attached to each other by a sealing material 3 with a spacing of about 5 to 7  $\mu\text{m}$  therebetween. A liquid crystal material 5 is injected and sealed in the space.

Pads 7 are formed on terminal ends of the wiring electrodes 6 corresponding to input/output terminals of a semiconductor chip. The wiring electrodes 6 are arranged obliquely with respect to an edge of the display panel to connect the display electrodes 4 and pads 7. Stated otherwise, on a portion of the glass substrate 1 at which the wiring electrodes 6 extend beyond the edge of the opposing substrate 2, the wiring electrodes are formed at an angle (obliquely) with respect to the edge of the opposing substrate 2.

The wiring electrodes 6 formed as described above are selectively plated by nonelectrolytic nickel plating. In particular, the wiring electrodes 6 exposed outside the display portion of the liquid crystal panel on the glass substrate 1 outside the edge 14 of the opposing substrate 2 are selectively plated using a nonelectrolytic nickel plating process. The plating liquid has a smaller angle of contact on the ITO surface of the transparent electrodes than on the glass surface. The glass surface repels the plating liquid in

comparison to the ITO surface. As a result, the plating liquid can easily remain at a step formed by the glass substrate 1 and the opposing substrate 2 and between an adjacent pair of wiring electrodes, covering the glass portion where no wiring electrode exists.

In particular, Fig. 2A shows plating liquid 9 remaining between the outermost wiring electrode and the wiring electrode adjacent thereto. A bridge 10 of nickel thin film can thus form along the periphery of the mass of remaining plating liquid 9 between the wiring electrodes.

The present invention overcomes the foregoing problem by providing a liquid crystal display device in which a display element in which a portion of an insulating substrate at which a bridge short circuit can occur particularly easily, and at which wiring electrodes on the insulating substrate extend beyond an edge of an opposing substrate, is provided so that the wiring electrodes are perpendicular to the edge of the opposing substrate. In accordance with another aspect of the invention, a dummy electrode is formed adjacent to an outermost wiring electrode so that even if a bridge short circuit occurs, a malfunction is avoided. Preferably, the spacing between the dummy electrode and the outermost wiring electrode is equal to or smaller than the spacing between the outermost wiring electrode and the wiring electrode adjacent thereto.

A display device in accordance with the first aspect of the invention has an insulating substrate on which display electrodes and wiring electrodes are formed, an opposing substrate opposed to the insulating substrate, and a display material sealed in a space between the substrates. Portions of the wiring electrodes extending beyond a side edge of the opposing substrate are perpendicular to the side edge so that when the wiring electrodes are metallized by plating, the possibility of a residue of plating liquid is reduced.

The cited references fail to disclose or suggest the claimed subject matter.

In support of the anticipatory rejection of claims 1-5, the Examiner cited various portions of Fujii as disclosing all features of the invention recited in claims 1-5. In particular, the Examiner stated that Figs. 12A-12B and claim 1 of Fujii discloses wiring electrodes metallized by an ITO film and having portions that extend across a contour line of the opposing substrate, and in Figs. 4-7 a dummy electrode 45 having the claimed features.

However, Figs. 12A-12B and claim 1 of Fujii fail to disclose that the wiring electrodes extend beyond a side of the opposed substrate, perpendicularly thereto.

As set forth in independent amended claim 1 and newly added independent claim 13, the inventive display device

has an insulating substrate and an opposing substrate arranged such that a surface of the insulating substrate confronting the opposed substrate extends beyond a side edge of the opposed substrate. Wiring electrodes formed on the insulating substrate extend beyond the side edge of the opposing substrate perpendicularly to the side edge of the opposing substrate.

Although Fujii discloses a liquid crystal display device having various features recited in claim 1, the reference fails to disclose one substrate extending beyond the side edge of the other substrate. Nor does Fujii disclose or suggest wiring electrodes extending beyond the side edge of the opposing substrate perpendicularly to the side edge. In fact, Fujii discloses that the wiring electrodes are tapered.

The portion of Fujii cited by the Examiner does not purport to disclose the above-described subject matter of claim 1. Nor does such subject matter appear in the claims of Fujii.

Amended claim 2 recites a display device having display electrodes, wiring electrodes and connection pads formed on an insulating substrate, the wiring electrodes being metallized by plating and connected to the connection pads. A dummy electrode is provided on the insulating substrate adjacent an outermost wiring electrode of each group of wiring

electrodes, the dummy electrode not being connected to any of the connection pads. Amended claim 2 further recites that the display electrodes are transparent electrodes, and the wiring electrodes are formed by plating portions of the transparent electrodes extending beyond the side edge of the opposing substrate

As disclosed at col. 10, line 47 through col. 11, line 23 of Fujii, the dummy electrodes 45 and 46 are connected to parallel electrodes 45a. According to the present invention, the dummy electrodes are not connected to any pads. Moreover, Fujii discloses metal electrodes having a narrower width than the display electrodes. Fujii does not disclose wiring electrodes formed by plating a transparent electrode surface.

Anticipation under 35 U.S.C. §102 requires the identical disclosure by a single reference of all claimed subject matter. See W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) ("Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration"). The cited reference to Fujii fails to disclose the orientation of the wiring electrodes with respect to the side edge of the opposed substrate recited in claim 1,



and fails to disclose the plated structure of the wiring electrode and that the dummy terminal is not connected to any pad as recited by claim 2. Thus, Fujii does not anticipate amended claims 1 and 2 and newly added independent claim 13.

Nor does Fujii render obvious the subject matter of claims 1, 2 and 13. A claim rejection based upon obviousness must be supported by an evidentiary basis establishing the obviousness of every limitation of a rejected claim. When an obviousness rejection is based upon the obviousness of a proposed modification, such modification must also be suggested by the prior art. In re Fritch, 23 USPQ2d 1780, 1783 (Fed. Cir. 1992) ("The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification"). Fujii would not have suggested the modifications required to its display device to fall within the scope of amended independent claims 1 and 2.

Accordingly, applicants respectfully submit that amended independent claims 1, 2 and 13 and dependent claims 3-5, 8-12 and 14-20 patentably distinguish over the prior art of record.

In view of the foregoing amendments and discussion, the application is now believed to be in condition for

allowance. Accordingly, favorable reconsideration and allowance of the claims are most respectfully requested.

Respectfully submitted,

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JULY 1, 2002

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VERSION WITH MARKINGS TO SHOW CHANGES MADE JUL 15 2002

TC 2800 MAIL ROOM

IN THE CLAIMS:

Claims 1-6 have been amended as follows:

1. (Amended) A display device comprising:

an insulating substrate on which display electrodes and wiring electrodes are formed;

an opposing substrate opposed to the [said] insulating substrate, the insulating substrate and opposing substrate being arranged such that a surface of the insulating substrate confronting the opposed substrate extends beyond a side edge of the opposed substrate; and

a display material contained in a spacing between the [said] insulating substrate and the [said] opposing substrate in a sealed [sealing] manner; [,]

wherein the [said] wiring electrodes are metallized by plating, and each of the [portions of said] wiring electrodes on the surface of the insulating substrate extends beyond the side edge [extending across a contour line] of the [said] opposing substrate perpendicularly [is formed perpendicular] to the side edge [contour line] of the [said] opposing substrate.

2. (Amended) A display device comprising:

an insulating substrate on which a group of display electrodes, a group of [and] wiring electrodes and a group of connection pads are formed, the wiring electrodes being connected to the connection pads and arranged in at least one group;

an opposing substrate opposed to the [said] insulating substrate; [and]

a display material contained in a spacing between the [said] insulating substrate and the [said] opposing substrate in a sealed [sealing] manner; and [,]

[wherein said wiring electrodes are metallized by plating, and] a dummy electrode [is] provided on the insulating substrate adjacent an [outside the] outermost wiring electrode [one] of each group of [said] wiring electrodes, the dummy electrode not being connected to any of the connection pads;

wherein the display electrodes are transparent electrodes, and the wiring electrodes are formed by plating portions of the transparent electrodes extending beyond the side edge of the opposing substrate.

3. (Amended) A display device according to claim 2; [Claim 2,] wherein a [the] spacing between the [said] dummy electrode and the outermost wiring electrode is equal to or

smaller than a [the] spacing between the outermost wiring electrode and a [the inner] wiring electrode directly adjacent thereto [next to the outermost wiring electrode].

4. (Amended) A display device according to claim 2; [Claim 2,] wherein the [said] wiring electrodes comprise a plurality of groups of wiring electrode [groups] each group having [formed of] a plurality of wiring electrodes; [,] and wherein a dummy electrode is [electrodes are] provided adjacent to outermost [outside the opposite-end] wiring electrodes in each of the groups of [said] wiring electrodes [electrode groups].

5. (Amended) A display device according to claim 2; [Claim 2,] wherein the [said] dummy electrode is formed parallel to the outermost wiring electrode.

6. (Amended) A display device comprising:  
an insulating•substrate on which display electrodes are formed;

an opposing substrate opposed to the [said] insulating substrate;

a display material contained in a spacing between the [said] insulating substrate and the [said] opposing substrate in a sealed [sealing] manner;

a semiconductor chip for supplying signals to the [said] display electrodes;

a group of connection pads arranged on the [said] insulating substrate corresponding [so as to correspond] to connection terminals of the [said] semiconductor chip;

a group of check pads provided between the [said] display electrodes and the [said] group of connection pads; and

wiring electrodes for establishing electrical connections between the [said] display electrodes and the [said] group of check pads corresponding to the semiconductor chip terminals, and electrical connections between the [said] group of check pads and the [said] group of connection pads corresponding to the semiconductor chip terminals; [,]

wherein the [said group of] check pads are arranged in a straight row and some of the group of connection pads corresponding to the semiconductor chip terminals form a part of the group of check pads.